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# Comparing Performance Measurement Approaches in Accounting Research<sup>1</sup>

## ABSTRACT

*Whilst a substantial body of empirical accounting literature has examined whether selected accounting, auditing, and management control systems, practices, and innovations improve performance, the various performance measurement approaches used in these studies have been addressed and compared less extensively. This comparative literature analysis investigates prior literature to develop a framework for assessing and comparing the following three primary approaches to performance measurement: the accounting-based, goal-centered, and behavioral approaches. 100 empirical studies are reviewed to illustrate how the concept of performance can be, and has been, measured. Following that, an inventory of the applied methods, samples, performance criteria, and performance measures is made. Then, a methodological analysis is conducted to assess and compare the advantages and disadvantages of the various approaches according to the most common methods on several dimensions reflecting recent advancements made in accounting research. Future research possibilities are also suggested.*

**Keywords:** *accounting, performance measurement, performance criteria, performance measures, literature analysis.*

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## 1. INTRODUCTION

Performance measurement is a central theme in accounting. Accounting research and education on performance measurement splits, at the least, into four broad areas of inquiry. The first focuses on accounting as a performance measurement system that generates various reports for various purposes. The second is concerned with strategic measurement systems including both financial and non-financial measures designed, selected, implemented, used, and maintained by organizations. The third considers the role of performance measurement systems as part of management control systems in developing and implementing strategies, evaluating the achievement of objectives, providing feedback, and rewarding managers. The fourth analyzes empirically why, how and when accounting systems and processes relate to performance. Here, the interest is in the effectiveness of accounting, auditing and control systems, practices, and innovations. That is, do they improve performance? This study is related to this latter area of broader performance measurement research, in which performance has been empirically examined as a dependent variable.<sup>2</sup>

Whilst prior studies suggest that there is not a generally accepted approach to performance measurement in empirical accounting research (Langfield-Smith, 1997; and Vagneur and Peiperl, 2000, 518), the various approaches have been addressed far less. The exceptions include a few studies that have addressed alternative performance measurement approaches that could (Otley, 1980, 421–424)<sup>3</sup> or have been used (Chenhall, 2003, 132–136)<sup>4</sup> in the contingency-based management accounting research or in financial ratio analysis (Salmi and Martikainen, 1994).<sup>5</sup> Research on the criteria impacting the choice of an appropriate performance measurement approach is even sparser culminating in Foster and Swenson's (1997) statistical analysis of the explanatory power of various success measures used in activity-based budgeting research. Whilst extremely useful, all these studies are grounded in specific research fields. Further analysis of alternative approaches and identification of additional criteria, could aid both in the evaluation of account-

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2 For some examples, see Horngren et al. (2002), Alexander and Nobes (2001), and Galautier and Underdown (2000), for the first area of inquiry; Järvenpää et al. (2001), Malmi (2001), Vaivio (1999), Kihn (1997), Kaplan and Norton (1992, 1993), and Bromwich and Bhimani (1989) for the second area of inquiry; Anthony and Govindarajan (2000), Merchant (1997) Emmanuel et al. (1991), and Virtanen (1985) for the third area of inquiry; and the literature reviews of Chenhall (2003) and Libby et al. (2002) for the fourth area of inquiry.

3 Otley recommended the analysis of both individual and organizational level outcomes.

4 Chenhall analyzed outcomes and separated them into issues related to the use or usefulness of the management control system, behavioral and organizational outcomes.

5 Salmi and Martikainen applied the following four approaches for financial ratio analysis: pragmatic empiricism, a data oriented classification approach, a deductive approach, and a combination of the latter two.

ing research and in the selection of appropriate performance measurement approaches, criteria, and measures.<sup>6</sup>

Prior accounting and management research indicates that at least three primary approaches have emerged to evaluate, amongst other things, performance within or across organizations – these being the accounting-based, goal-centered and behavioral approaches.<sup>7</sup> In the following, these different approaches to performance measurement are first defined. It is then illustrated, how these approaches have been used in accounting research, drawing from a sample of 100 empirical studies published in some of the leading accounting journals. Several dimensions are then identified that might aid in the methodological assessment and comparison of these three approaches. Thereafter, an attempt is made to assess and compare the accounting-based, goal-centered and behavioral approaches to performance measurement on the basis of the selected dimensions reflecting recent advancements made in accounting research. After summarizing the main findings and presenting the conclusions, suggestions for improving future research and future research topics are provided.

## 2. DEFINITIONS AND EXAMPLES OF THE PERFORMANCE MEASUREMENT APPROACHES

In the accounting-based approach, performance is assessed with accounting information such as profitability, liquidity, and solvency ratios derived from financial statements. To economists, financial analysts, and major decision-makers of business organizations, performance effectiveness is often synonymous with financial viability (Steers, 1977). Referring to Price and Mueller (1986, 128): “An organization that can pay its bills and have surplus funds is more financially viable than an organization that has to borrow to discharge its obligations.”

Examples of the accounting-based approach can be seen in Said et al. (2003), Ittner and Larcker (1998), Simons (1987), and Dess and Robinson (1984). Said et al. used return on assets (ROA) to examine current and future accounting performance. Ittner and Larcker applied accounting book values such as revenues, expenses, margins and return on sales. Simons studied performance in terms of the business unit’s mean absolute three-year return on investment (ROI). Dess and Robinson (1984) surveyed the rated firm after tax return on total assets and total sales growth relative to firms of similar sales volume in the same industry and region over a five-year period.

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<sup>6</sup> With regards to research, this could be the case with deductive studies. In deductive studies, performance measures are selected in advance, whilst, in inductive studies, the empirical findings, of e.g., company or industry practices, impact these choices.

<sup>7</sup> Other studies, e.g., finance studies using share prices, are beyond the scope of this paper.

*In the goal-centered approach*, it is typically the performance of an organization, or an organizational subunit such as a work group, or a project, that is assessed relative to goals. The set of goals should be manageable and clearly defined (Campbell, 1976, 31). Typically, the goal-centered approach is based on the following steps: 1) selecting the goals to be evaluated, 2) determining the weights to be assigned to each goal, and 3) determining the standards against which reported values on goals are to be assessed. Organizational researchers define effectiveness as a general level of organizational goal attainment (Steers, 1977).

Whilst the accounting-based approach is rooted in accounting literature, the goal-centered approach is rooted in organization research. The accounting-based approach relies on financial measurements, but in the goal-centered approach, the respondents are requested to rate actual achievement of non-financial (operational) goals, sometimes together with financial goals.<sup>8</sup> Modern management accounting literature provides several examples of goal-centered performance measurement models (e.g., Judson, 1990; Lynch and Cross, 1991; Fitzgerald et al., 1991; Laitinen, 1998, 2002; and Chenhall, 2004). Kaplan and Norton (1992, 1993, 1996) identify the financial goal(s) as the ultimate goal, and the other goals (i.e., customer, internal, innovation and learning goals) as ways of achieving the ultimate goal(s).

Govindarajan's (1984, 1985) measurement instrument is an example of a goal-centered measure. His self-rating instrument measures effectiveness on a five-point Likert-type scale in the form of a comparison between actual performance and a priori expectations on several performance dimensions (i.e., sales growth rate, market share, operating profits, profit to sales ratio, cash flow from operations, ROI, new product development, market development, research and development, cost reduction programs, personnel development and political/public affairs). A modified version of Govindarajan's measure has been used to compare a firm to its competitors over a period of time (Chenhall and Langfield-Smith, 1998).

In the behavioral approach, developed by psychologists, individual performance is examined as a determinant of performance effectiveness. Performance of groups of individuals has also been considered. Scott and Tiessen (1999), for example, have analyzed team performance. The underlying premise is that ultimately effective performance can only be attained through the behavior of organization members (Steers, 1977, 6). The well-being of personnel is expected to show in the profitability and assets of the organization.

Some researchers have conducted experiments to measure individual performance directly (e.g., Libby, 1999; and Bonner, 1990). Others, for example, Mahoney et al. (1963, 1965), have surveyed perceptions of individual performance directly. Some others may have aimed to indi-

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<sup>8</sup> Hence, for the purposes of this research, a study that uses purely financial criteria is considered an example of the accounting-based rather than goal-centered approach.

rectly analyze the level of individual work performance through the perceived level of employees' work motivation (Mia, 1988), job satisfaction (Weiss et al., 1967), job-related tension (JRT) (Hopwood, 1972), and attitudes (Imoisili, 1989). Or they may have found such enhanced employee welfare or job satisfaction as a worthwhile goal on its own right (Chenhall, 2003). Whilst scant empirical evidence relates job satisfaction to performance (Selto et al., 1994, 675), evidence of a curvilinear relationship between JRT and managerial performance is provided in Dunk (1993).

An example of the behavioral approach can be seen in the measurement instrument of Mahoney et al. (1963, 1965). The instrument has been applied in Brownell (1982; 1985; 1987) and Dunk (1993). The Mahoney et al. nine-item self-rating measure consists of a single overall performance rating together with ratings on eight sub-dimensions of managerial activity, or behavior. These include: planning, investigating, coordinating, evaluating, supervising, staffing, negotiating, and representing.

### 3. LITERATURE ANALYSIS

The following literature analysis illustrates how the concept of performance can be, and has been, measured. It is based on a carefully considered sample of 100 accounting studies published in the Journal of Accounting Research (JAR), The Accounting Review (TAR), and Accounting, Organizations and Society (AOS) during a fifteen year period in 1987-2002 (Appendix 1). Twelve of the 100 studies have been published in the Journal of Accounting Research (JAR), 39 in The Accounting Review (TAR), and 49 in Accounting, Organizations and Society (AOS).<sup>9</sup> These journals are selected, because they have been highly rated in citation analysis (Howard and Nikolai, 1983;

**TABLE 1. Frequency of occurrence of an approach to performance measurement in 100 accounting studies**

Approach to performance measurement:	JAR		TAR		AOS		Total	
	F	%	F	%	F	%	F	%
Accounting-based	5	41.7	4	10.3	7	13.6	16	15.5
Goal-centered	2	16.6	2	5.1	11	21.1	15	14.6
Behavioral	5	41.7	33	84.6	34	65.4	72	69.9
Total	12	100.0	39	100.0	52*)	100.0	103*)	100.0

\*) Three studies used two approaches simultaneously.

<sup>9</sup> While all the articles were collected and classified by the author, another researcher independently crosschecked the results in the tables.

Brinn et al., 1996; Lowe and Locke, 2004), frequently published accounting studies that analyze performance, and also in published behavioral studies.<sup>10</sup>

The inclusion criteria were that the selected studies empirically, and as explicitly as possible, measure “performance”, “effectiveness”, “motivation”, “effort”, etc. as a dependent variable. The screening of journals proceeded from 1987 journal issues to recent ones. The screening of the articles started from the title, and, if relevant, continued to the key word list, abstract, introduction, and method section. An attempt was made to include as many articles as possible, if not all the relevant studies.

Table 1 presents the approach breakdown of the 100 accounting studies. Overall, the behavioral approach to performance measurement has been the predominant approach (69.9%) in this sample. This is not surprising, since the selected journals are known to have frequently published behavioral studies (Meyer and Rigsby, 2001, p. 253). There have been fewer studies using the other approaches [i.e, the accounting-based approach (15.5%) and the goal-centered approach (14.6%)]. Examining the findings according to the journals, TAR and AOS have predominantly used the behavioral approach, followed by the goal-centered or accounting-based ap-

**TABLE 2. Frequency of occurrence of a method of data collection and sample in 100 accounting studies**

Approach to performance measurement:							
	Accounting-based approach		Goal-centered approach		Behavioral approach		Total
	F	%	F	%	F	%	F    %
<b>A. Method of data collection:</b>							
Mail or interview survey	7	41.2	12	66.7	30	40.5	49    45.0
Laboratory experiment	2	11.8	2	11.1	38	51.4	42    38.5
Database/archival	8	47.0	3	16.7	4	5.4	15    13.8
Case/other	0	0.0	1	5.5	2	2.7	3    2.7
<b>Total</b>	<b>17</b>	<b>100</b>	<b>18</b>	<b>100</b>	<b>74</b>	<b>100</b>	<b>109*)    100</b>
<b>B. Sample:</b>							
Managers/directors	3	18.8	7	43.7	24	31.2	34    31.2
Students	0	0.0	2	12.5	21	27.2	23    21.1
Auditors	1	6.2	0	0.0	17	22.1	18    16.5
Firms	11	68.8	1	6.3	3	3.9	15    13.8
Employees	0	0.0	1	6.3	3	3.9	4    3.7
Analysts	1	6.2	0	0.0	2	2.6	3    2.8
Not-for-profit organization	0	0.0	2	12.5	0	0.0	2    1.8
Accountants	0	0.0	0	0.0	2	2.6	2    1.8
Other	0	0.0	3	18.7	5	6.5	8    7.3
<b>Total</b>	<b>16</b>	<b>100</b>	<b>16</b>	<b>100</b>	<b>77</b>	<b>100</b>	<b>109**)    100</b>

\*) A few studies used two methods simultaneously.

\*\*) Some studies used two kinds of sample.

**10** Hence, the sample of this study is not random. Note that the results of the analyses should not be generalized. Instead, the results describe the set of data.

proaches. The sample studies published in JAR have most often adopted either the behavioral or the accounting-based approach (each in five cases), followed by the goal-centered approach (in two cases). Three recent studies used two approaches simultaneously: Selto et al. (1995) used the goal-centered approach to measure attainment of work group goals and the behavioral approach to analyze job satisfaction. Van der Stede (2000) applied both accounting-based and behavioral approaches to assess company performance. Vagneur et al. (2000) used accounting-based and goal-centered approaches to measure company performance. The vast majority of studies have, however, applied a single approach to measure performance.

Table 2, Panel A shows that overall, the 100 studies analyzed have mostly used surveys, (laboratory) experiments, and database/archival methods. A few studies had selected the case study method in this sample. Overall, in this sample, surveys rank first (45%), experiments second (38.5%), and database and archival studies third (13.8%). However, substantial differences in the emphasis of research methods are found between the studies using different approaches to performance measurement. The studies applying the behavioral approach have mostly adopted laboratory experiments (51.4%), followed by surveys (40.5%). The articles using the accounting-based approach have most often used database or archival analysis (47%), followed by surveys (41.2%). The studies using the goal-centered approach have predominantly utilized the survey method (66.7%), followed by database/archival (16.7%) and laboratory experiments (11.1%). Overall, five of the 100 studies used archival and survey methods simultaneously. Four percent of the studies combined case studies or interview surveys with mail surveys. Overall, among the 100 accounting studies, the most popular subjects were managers/directors (31.2%), followed by students (21.1%) and auditors (16.5%) (Table 2, Panel B). This order of ranking also appears in studies using the behavioral approach to performance measurement, which represent the largest share of all studies. The studies using the behavioral approach have more occasionally collected data from a sample of firms (3.9%), employees (3.9%), analysts (2.6%) or accountants (2.6%). A large share of the articles utilizing the goal-centered approach to performance measurement has analyzed managers or directors (43.7%), students (12.5%) or not-for-profit organizations (12.5%). Some of the remaining articles have analyzed either firm or employee performance. In sharp contrast, the studies applying the accounting-based approach have predominantly analyzed firms (68.8%) and only in the remaining cases collected data from managers/directors, auditors, etc. In conclusion, the studies using different approaches to performance have emphasized different samples.

Table 3 summarizes the rankings of performance criteria among the studies applying the accounting-based, behavioral or goal-centered approaches. In cases where the criteria have the same frequency of occurrence, the articles are listed in alphabetical order. The 100 reviewed studies have used 66 different criteria 136 times in total. In a few cases, both goal-centered and



**TABLE 3.**  
**Frequency of occurrence of performance criteria in 100 accounting studies**

<i>Performance criteria:</i>	<i>Approach to performance measurement:</i>			
	Accounting-based	Goal-centered	Behavioral	Total
Audit performance	0	0	18	18
Managerial performance	0	0	16	16
Job performance	0	2	4	6
Test performance/accounting grades	0	0	6	6
Experimental task performance	0	0	5	5
ROA (absolute or relative)	3	1	0	4
Effort level	0	0	4	4
Job satisfaction	0	0	4	4
Subordinate performance	0	0	3	3
Company performance	1	1	0	2
Decision performance	0	0	2	2
Forecast accuracy	1	0	1	2
Job related tension	0	0	2	2
Manufacturing plant performance	0	2	0	2
Relative departmental performance	0	1	1	2
Relative firm/organizational performance	0	1	1	2
Relative profitability	1	0	1	2
ROE	2	0	0	2
Sales growth (absolute or relative)	2	0	0	2
Stock returns	2	0	0	2
Subunit performance	0	1	1	2
Work motivation	0	0	2	2
ABC-model development time	0	0	1	1
ABC-model complexity	0	0	1	1
Accounting performance	1	0	0	1
Accounting returns	1	0	0	1
Analyst performance	0	0	1	1
Asset turnover	1	0	0	1
Attainment of work group goals	0	1	0	1
Attitude towards budget	0	0	1	1
Attitude towards budgeting staff	0	0	1	1
Attitude towards job and company	0		0	1
Attitude towards supervisor	0	0	1	1

TABLE 3. (continued)

Frequency of occurrence of performance criteria in 100 accounting studies

Performance criteria:	Approach to performance measurement:			
	Accounting-based	Goal-centered	Behavioral	Total
Budget motivation	0	0	1	1
Budgetary performance	0	0	1	1
Business unit performance	0	0	1	1
Contribution from toll-free-lines	1	0	0	1
Department performance	0	1	0	1
Hospital performance	0	1	0	1
Investor judgment performance	0	0	1	1
Long-term excess return to shareholders	1	0	0	1
Manufacturing experiment performance	0	1	0	1
Net income	1	0	0	1
Net interest income	1	0	0	1
Net margin	1	0	0	1
Number of good units produced	0	1	0	1
Operating profit	1	0	0	1
Operating ratio	1	0	0	1
Operating margin	1	0	0	1
Organizational commitment	0	0	1	1
Overall motivation	0	0	1	1
Product quality	0	1	0	1
Profit	0	0	1	1
Profit efficiency	0	0	1	1
Profit margin	1	0	0	1
Project performance	0	1	0	1
Pre-tax return on sales	1	0	0	1
Risk (beta)	1	0	0	1
ROS	1	0	0	1
Sales revenue	1	0	0	1
Socially desired non-financial goals	0	1	0	1
Tax research performance	0	0	1	1
Team performance	0	0	1	1
Total assets	1	0	0	1
Total audit hours/total assets	1	0	0	1
Turnover intentions	0	0	1	1
Total:	30	17	89	136

TABLE 4.

*Frequency of occurrence of a performance measurement instrument in 100 accounting studies.*

Source of measure:	Measure:	Number of times mentioned:
No citation		63
Mahoney et al. (1963, 1965)	Managerial performance	11
Weiss, Davis, England, and Lofquist (1967)	Job satisfaction	3
Govindarajan (1984)	Firm/subunit/job performance	3
Chow (1983)	Experimental task performance	2
Firm data	Attainment of goals	2
Kahn, Wolfe, Quinns, Snoek and Rosenthal(1964)	Job-related tension	2
Lawler and Suttle (1973)	Work motivation	2
Van de Ven and Ferry (1980)	Managerial performance	2
AICPA	Test performance	1
Ashton (1974)	Task performance	1
Bettelman, Johnson & Payne (1990)	Effort level	1
Bonner & Lewis (1990)	Auditor performance	1
Chenhall (1993)	Self-rated sales growth, ROA, etc.	1
Chow, Cooper and Walter (1988)	Experiment performance	1
Coackley & Loebbecke (1985)	Test performance	1
Collins (1978)	Budget attitude	1
Drazin and Van de Ven (1985)	Job satisfaction	1
Dunette and Borman (1979)	Job performance	1
Fisher, Frederickson & Pfeffer (2002)	Subordinate performance	1
Gregson, Wendell & Aono (1994)	Role stress	1
Industry analysts	Operating ratio & net income	1
Kalbers & Fogarty (1995)	Job performance	1
Kenis (1979)	Budgetary performance	1
Kinney (1987)	Test performance	1
Management consulting firm	Self-rated financial measures	1
Merchant (1981)	Overall performance	1
Milani (1975)	Attitudes towards job and company	1
Mowday, Steers and Porter (1979)	Organizational commitment	1
Nelson, Libby, and Bonner (1995)	Audit performance	1
Palmrose (1989)	Total audit hours/total assets	1
Read (1962)	Attitudes toward supervisor	1
Shenkar – Dvir (1996)	Project performance	1
Steers (1975)	Company performance	1
Young (1985)	Experiment performance	1
Total		116

behavioral approaches have been used to measure “job performance”, “relative firm performance”, “subunit performance”, and “relative departmental performance”, although in different studies. Both the accounting-based and behavioral approaches have been applied to measure “forecast accuracy” and “relative profitability”. Likewise, both the accounting-based and goal-centered approaches have been used to estimate “ROA” and “company performance”. Very little overlap is seen among the performance criteria across these various approaches.

The studies using the behavioral approach have used 34 performance criteria 89 times in total. The most common of these criteria are: audit performance (18 cases), managerial performance (16 cases), test performance/academic grades (6 cases), and experimental task performance (5 cases) (see Table 3). The publications utilizing the accounting-based approach have applied 26 performance criteria 32 times in total. The most common criteria are: ROA (3 cases), ROE, sales growth, and stock returns (each 2 cases). The articles applying the goal-centered approach have used 13 criteria, but only one of them, job performance, twice. Overall, the empirical literature clearly shows little cumulative character here.

Table 4 shows the frequency of occurrence of each measure in the studies. Clearly, in terms of performance measures, the analyzed accounting studies are fragmentary. First of all, in over half of the cases, there is no citation. This may indicate that performance has been assessed with an author-constructed measure, perhaps with a measure used in the investigated company, or with a common accounting measure. Numerous cited measures have been used in the remaining 53 cases. Based on this analysis, the most frequently cited measurement instruments are: 1) the Mahoney et al. (1963, 1965) managerial performance measure (11 cases); 2) Govindarajan’s performance measure (3 cases); and 3) the Weiss et al. (1967) Minnesota job satisfaction measure (3 cases).

#### **4. DIMENSIONS TO ASSESS AND COMPARE THE PERFORMANCE MEASUREMENT APPROACHES**

In the following several dimensions are introduced to aid in the assessment and comparison of the accounting-based, goal-centered and behavioral approaches to performance measurement. This is achieved by adopting a slightly modified version of Steers’ (1975, 1977) classification system. Whilst Steers’ classification system was identified for his research on organizational effectiveness, the dimensions seem important and useful for application in the wider analysis of alternative performance measurement approaches. Hence, the following seven dimensions will be used based on Steers (1975, 1977): theoretical relevance, level of analysis, criterion stability, time perspective, multiple criteria (hereafter, number of criteria), precision of measurement, and generalizability. One of Steers’ dimensions, construct validity, is not included since there is a lack

**TABLE 5.**  
**Comparing approaches to performance measurement**

	Approach to performance measurement:						
	<u>Accounting-based</u>		<u>Goal-centered:</u>			<u>Behavioral:</u>	
	<i>Archival</i>	<i>Survey</i>	<i>Archival</i>	<i>Experiment</i>	<i>Survey</i>	<i>Experiment</i>	<i>Survey</i>
<b>1. Theoretical Relevance</b>	high	high	high	high	high	high	high
<b>2. Micro or macro level analysis</b>	mostly macro	either	mostly macro	micro	mostly macro	micro	micro
<b>3. Criterion stability</b>	relatively high	relatively high	low to high	low to high	low to high	low to high	low to high
<b>4. Time perspective</b>	low to high	low to high	low to high	low to high	low to high	low to high	low to high
<b>5. Multiple vs. single criteria</b>	either	either	multiple	multiple	multiple	either	either
<b>6. Precision of measurement</b>	relatively high	low to high	relatively high	relatively high	low to high	high	low to high
<b>7. Generalizability</b>							
- of criteria	high	high	low to high	low to high	low to high	low to high	low to high
- of findings	high	high	high	low to medium	high	low to medium	high

of universal performance effectiveness models. Each of the seven dimensions will be described below. They will also be used to evaluate and compare the strengths and weaknesses of each of the three key approaches to performance measurements. Given the findings of multiple research methods (see Table 2, Panel A), the impact of various research methods is also considered, whenever relevant, to allow a more detailed analysis. Hence, studies applying the accounting-based approach to performance measurement are divided into archival studies and surveys. The studies using the goal-centered approach will be classified on the basis of archival, experimental and survey method. The studies using the behavioral approach will be divided into experiments and surveys. The theoretical framework is presented in Table 5.

#### 4.1 Theoretical relevance

From the standpoint of model building, Steers (1975) raises the issue of theoretical relevance. He argues that in order to have theoretical relevance, a model needs to increase our understanding of organizational activities and/or assist in making predictions about future behavior.

Regardless of the selected research method, all the primary approaches to performance measurement have high theoretical relevance. In the accounting-based approach, a single concept, such as financial viability, can be applied to various types of organizations creating a reasonable possibility of building a theoretical model of or predicting the determinants of performance (Price et al., 1986). The accounting-based approach has been applied in a wide range of models, for example, to analyze analyst forecast accuracy and performance of management accounting and control systems (see appendix 1). The goal-centered approach to performance measurement has been applied, for example, in several contingency-based management accounting papers (see appendix 1).

The behavioral approach to performance measurement can add to our understanding of accounting systems and processes, highlighting their relationships with individual actors. Here it may be analyzed how individuals perceive, understand the meaning of, and experience accounting systems and processes, whilst providing and using accounting information (Pihlanto, 1994; 1995, 5-6; Pihlanto, 2003, 156). A substantial body of behavioral accounting research has aimed to determine how, when, and why important features of accounting systems and processes (e.g., budgetary participation) influence individual behavior or performance (see Libby et al., 2002). In the past 15 years, the behavioral approach has been used, for example, in a number of empirical auditor judgment performance, analyst forecast behavior and contingency-based management control system studies (Appendix 1).

## **4.2 Level of analysis**

According to Steers (1975) and Otley (1980), performance may be analyzed at the micro or macro level, or by combining the two. Here the micro level analysis refers to the analysis of individual behavior. It may be the behavior of, for example, managers, analysts or production employees. At the macro level, organization-wide phenomena are analyzed within the organization, within the industry, or between industries as they relate to performance. Whether a micro or macro level of analysis is more suitable, is to a large extent impacted by the object of performance evaluation (e.g., a sample of organizations or individual managers).

The archival analysis of accounting-based performance measures is typically conducted at macro levels of analysis using financial statements. Generally speaking, it may be difficult or impossible to obtain financial information at an individual level. However, depending on the nature of an organization, availability of objective or subjective data, and provision of individual financial rewards, it may also be possible to consider a micro level analysis of financial viability. For example, it might be possible to analyze the financial work performance of portfolio managers, brokers, and insurance representatives. Surveys can be used to collect both macro and micro level data.

**TABLE 6.**  
**The choice of performance criteria: some examples**

Availability of:		
Level of analysis:	Objective data	Subjective data
<b>Individual:</b>	<b>Examples:</b> Experiment performance Portfolio return Broker's commission Brokerage sales	<b>Examples:</b> Self-rated managerial performance Self-rated work motivation Self-rated financial performance
<b>Organizational:</b>	<b>Examples:</b> Firm financial performance (e.g., ROI) Quantitative work performance (e.g., number of units or orders)	<b>Examples:</b> Self-rated absolute/relative overall organizational performance Self-rated qualitative work performance Self-rated achievement of financial and non-financial goals
<b>Industry:</b>	<b>Example:</b> Firm financial performance	<b>Examples:</b> Self-rated absolute firm financial performance Self-rated firm performance relative to goals and peers
<b>Between industries:</b>	<b>Example:</b> Firm financial performance	<b>Example:</b> Self-rated absolute and relative firm financial performance

With the goal-centered approach to performance measurement, the level of analysis ranges from micro to mostly macro. For example, in the case of some experiments, the goal-centered approach has been used at the micro level (see, e.g., Young et al., 1993). In the case of archival studies and surveys, the goal-centered approach is probably used most at the organizational (macro) level of analysis. If very specific goals are used, the goal-centered approach can be solely applied within single organizations. Others have argued that more general level goals can be tested across companies (Mahoney et al., 1963, 1965). However, different measures may be

needed at different levels of organizational analysis. Alternatively, weighted goal optimization measures could be used to integrate macro and micro levels of analysis as they relate to performance. According to Steers (1975, 556), this could lead to considerations of broader goals, such as financial, organizational, human, technological, and environmental.

The behavioral approach to performance measurement is most often conducted at the individual level. It has been the behavior of, for example, managers, auditors, or students that has been analyzed (Table 2, panel B). Experiment performance or survey scores typically form the unit of analysis. Although the behavioral approach seems most appropriate at the individual (micro) level of analysis, a wider viewpoint is also obtained when the individual level data can be aggregated across, for example, a group. Crossing levels of analysis or aggregating individuals to identify group or organization performance needs to be done carefully (see further, Luft and Shields, 2003, 195-200). One needs to maintain consistency between the theory, the unit or level of analysis and the source of measurement (Klein et al., 1994, 198; Luft and Shields, 2003, 196, and Chenhall, 2003, 156).

Table 6 illustrates possible performance criteria on the basis of the level of analysis and availability of objective and subjective data. Several possible examples of accounting-based, goal-centered, and behavioral performance criteria are proposed.

### 4.3 Criterion Stability

Relevant performance dimensions may vary over time and across organization(s). Whether the criteria used to evaluate performance are relevant with respect to changes in environmental conditions and goal preferences is an essential question. Steers (1975, 552) argues that the criteria used to measure performance at one point in time may be inappropriate, or even misleading, at a later time.

*The accounting-based approach* to performance measurement allows a relatively high level of criterion stability. This is because measures, such as profit and ROI, make sense for most profit-seeking companies under any circumstances. In addition, the accounting-based approach allows the use of different measures. For example, the level of investments could be used to approximate performance under good economic conditions and capital liquidity could be applied to approximate performance under poor economic conditions (Steers, 1975). Multiple weighted criteria (Altman, 1968; Steers, 1975) or mean financial performance over a number of years (see Simons, 1987; and Dess and Robinson, 1984) could also be measured to neutralize the effects of changes in environment and goal preferences. However, note that, using aggregated measures results in a loss of information concerning the different conditions encountered.

In the goal-centered approach to performance measurement, criterion stability ranges from low to high. The goal-centered approach allows the use of weighted goal optimization measures,



such as the one developed by Govindarajan (1984). These kinds of measures allow some flexibility in accounting for changes in goals over time, since the weights of the goals can be changed (Steers, 1975, 556).

The behavioral approach to performance measurement also provides several criteria that should be important in any circumstances. Nevertheless, organizations may change their emphasis on behavioral goals over time. It could be assessed how much weight organizations place on behavioral criteria, such as motivation, job satisfaction or job related tension, at a particular time (e.g., during a recession vs. a boom).

#### **4.4 Time Perspective**

Time perspective is a related problem. Specifically, the choice of time period (short, medium or long) may impact the results (Steers, 1975, 553; Hannan and Freeman 1977, 113). In particular, there may be lags between accounting system implementation and results. Moreover, a difficult question is how to balance short-term considerations with long-term interests in an effort to maximize stability and growth over time.

*The accounting-based* performance measures typically allow a wide range of historical analyses covering short-, medium- and long-term performance (Price et al., 1986, 132). Hannan and Freeman (1977, 113) suggest that the focus can be on short-term performance if the organization stresses quick ROI. If desired, the year-to-year fluctuations could also be discounted and the average performance over longer periods emphasized (see Simons, 1987). Although, as noted earlier, this would result in a loss of information related to the different conditions. Possible lags between accounting system implementation and results are best measured by using a longitudinal analysis (see Ittner and Larcker, 1997).

Likewise, the *goal-centered and behavioral approaches* allow the use of longitudinal study design. They also allow attempts to survey perceived mean performance over a longer period of time, although the length of the surveyed time period may impact the accuracy of data (i.e., more distant data might be reported with less accuracy). Studies using the behavioral approach to effectiveness may overcome some of the time perspective issues by conducting laboratory experiments.

#### **4.5 Number of Criteria**

Performance can be assessed with both univariate and multivariate models. Univariate models use only one measure, while multivariate models use multiple measures, often measured in terms of the sum of a set of criteria (Steers, 1977, 39–43).

*The accounting-based approach.* Multiple measures can be used in the accounting-based approach to performance measurement (see, e.g., Altman, 1968; and Hamilton and Shergill, 1992).

However, a single measure, such as ROI, can and often has been accepted as the main or only indicator of firm financial performance (see Simons, 1987, and Johnson and Kaplan, 1987, 3).

*The goal-centered approach* typically uses multiple criteria. At best, multivariate models of performance effectiveness may be successful in covering a larger proportion of overall performance than single measures. However, if organizations or researchers use multiple conflicting goals such as short-term productivity and job satisfaction (Steers, 1975, 552–553) or manufacturing efficiency and customer responsiveness (Lillis, 2002), then organizations, by definition, cannot be effective. Moreover, if non-financial measures do not have a clear connection to profitability, managers may end up making other than economic-based decisions. Therefore, if a multidimensional view is adopted, then a factor analysis needs to be conducted to study the interrelationships between criteria (Goodman and Pennings, 1977, 5). Note that some studies have empirically identified links between certain financial and non-financial measures (e.g., Laitinen, 1996, 2002; Ittner et al., 1998; Potter and Srinivasan, 2000; and Banker and Potter, 2000).

The behavioral approach to performance measurement allows the use of single or multiple criteria. For example, the Mahoney et al. (1963, 1965) measure explicitly recognizes the dimensionality of managerial performance. The problems inherent in multidimensional measures can be avoided by the use of the overall effectiveness dimension of the Mahoney et al. (1963, 1965) measure. Published studies have consistently shown that: 1) this overall rating greatly correlates with the other eight dimensions of that measure (Govindarajan, 1996), and 2) the overall rating captures a large proportion (typically over 55%) of the variation in performance on the eight dimensions of the measure (Mahoney et al., 1963, 1965; Brownell, 1982; and Dunk, 1993).

#### **4.6 Precision of Measurement**

Performance should be quantified accurately and consistently. This is difficult because of the magnitude and complexity of the concept. In addition, workers and managers may manipulate accounting numbers (Hopwood, 1972); performance measures, as such, do not address differing performance potentials; and the level of standard set can be problematic. Nevertheless, rigorous attempts should be made to achieve more precise measures of the performance criteria under study (Steers, 1975, 553; Ittner 2004).

The accounting-based approach. Archival analysis of financial statements can provide relatively precise approximations of financial viability in the historical sense. However, it needs to be recognized that financial measures may be defined in different ways across organizations and years due to significant changes in accounting principles, calculation rules, valuation and depreciation methods, reporting practices and/or organizational structures. They may also be affected by fluctuating exchange, interest, and inflation rates. Nevertheless, some clear advantages of financial measures compared to other “softer” measures are that they provide reasonably objective,

verifiable, and hard information (Ijiri, 1975). Generally speaking, financial ratios are well defined compared to other performance measures (cf. Järvenpää et al., 2001, 187). For these reasons, the use of financial measures is generally preferred.

Archival analysis of financial performance is not always possible. According to Dess et al. (1984), self-rated financial performance measures could be used when the more objective measures are not available (e.g., in the analysis of privately held firms, conglomerate business units, departments, groups, and certain individuals), and when the alternative is to remove the consideration of performance from the research design (i.e., performance is not measured at all).

According to Birnberg et al. (1990, 49) a clear weakness of all kinds of surveys (i.e., internet, mail, and interview surveys) is that they typically rely on unverified subjective self-reports in assessing behavior. The need to provide anonymity to the participants conflicts with the ability to secure objective data on the investigated variables. On the one hand, survey research can provide interesting data not otherwise available. On the other hand, a strong reliance on self-reports makes survey research subjective to reactivity effects and subjective biases. Reactivity effects refer to the condition in which an actor is aware that his or her behavior is observed and recorded, and it can cause the actor to modify his or her behavior. Subjective biases include recall, incentive, and halo effect.<sup>11</sup>

Some researchers argue that subjects' self-ratings may actually be less biased than supervisory ratings (Heneman 1974) or what researchers typically expect (Venkatraman and Ramanujam, 1987). A moderate agreement between supervisory ratings and self-ratings has been found in Parker et al. (1959) and Kirchner (1965). The more recent findings of Dess et al. (1984) and Simons (1987) suggest strong positive correlations between self-reported and published financial performance. However, Birnberg et al. (1990, 49) advocate making correlations between subjective self-reports (e.g., self-rated performance) and more objective information (e.g., data collected from financial statements) to make surveys stronger.

*The goal-centered approach* to performance measurement typically spans financial measures, 'harder' non-financial measures, and 'softer' measures. Of these, the 'harder' non-financial measures (e.g., on inventory levels, lead-time and labor productivity) may be relatively precise and reasonably objective. However, a critical weakness of the goal-centered approach is that precise measurement of organizational goals and outcomes is difficult (Hannan and Freeman, 1977). First, goals identified by researchers and those identified by practitioners can differ. Second, organizational goals may be unspecified. Third, official goals are likely to differ from more private operative goals (e.g., maximize profit) and operational goals (e.g., manufacture and sell one mil-

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**11** Halo effect is an error on psychological rating. According to Thorndike (1920), the halo effect is the extension of an overall impression of a person (or of a particular trait) to influence the total judgment of that person. The effect is to evaluate an individual high on many traits because of a belief that the individual is high on one trait.

lion mobile phones this year) (Steers, 1977). Fourth, an individual manager's goals are likely to differ from organizational goals (Hopwood, 1974). Fifth, the utility of multiple goals to various individuals is likely to differ. This complicates the weighting of multiple goals and short- versus long-run payoffs (Hannan and Freeman, 1977). Sixth, since the goals may have been set too low, it may be necessary to compare goal attainment relative to peers (see Chenhall and Langfield-Smith, 1998). Seventh, the use of self-rated survey data may be far from objective as discussed above (i.e. range from low to high in precision). The precision of measurement is likely to increase, when the measures are collected from archival sources or with experiments, and to decrease, when the data is collected with self-rated questionnaires.

In the behavioral approach to performance measurement, the precision of measurement ranges from low to high. Kahn (1977, 247) has pointed out that behavior is probably best measured by direct observation. In some topic areas (e.g. in audit judgment performance), laboratory experiments can be used to measure performance directly and relatively precisely. In other topic areas, direct observations of behavior are more difficult and expensive to obtain, and the behaviors that are readily observable are seldom those of research interest. According to Kahn (1977), this is likely to lead either to the analysis of such variables that can be assessed with available surrogates or to the use of self-reported data, which can potentially be less precise in nature (i.e., range from low to high in precision).

#### **4.7 Generalizability**

An important issue is how widely selected performance criteria can be generalized to other organizations. Steers (1975, 554) argues that generalizability requires that criteria are consistent with the goals and purposes of the organization. Another important question is to what extent the research findings can be generalized. Whilst the use of archival and survey methods enhances the generalizability of findings assuming sample randomness, the generalizability of studies using laboratory experiments has been rated from low to medium by Birnberg et al. (1990, 36). They stress that it is the theory that has been supported by the experimental results. Therefore theory can be generalized rather than the specific results of a particular experiment. As Libby et al. (2002) point out, the extent to which insights found in an experiment can be generalized needs to be tested further.

One of the strengths of the accounting-based approach is that the external validity of financial performance measures is high. Price and Mueller (1986) point out that financial measures are highly applicable to a wide range of organizations such as business organizations, not-for-profit organizations, and communities. The use of financial ratios also allows for various comparisons. Price and Mueller (1986, 132) argue that while the most meaningful comparisons are historical ones between competitors, financial ratios may also be used to compare non-com-

petitors. This is because all organizations strive to obtain a share of the limited amount of capital in a society.

The goal-centered approach. Hannan and Freeman (1977, 111) express the view that since the goals of various organizations differ, the external validity of the goal-centered approach is limited across various types of organizations. Pfeffer (1977, 133) has, however, pointed out that the extent of an organization's goal attainment can only be assessed comparatively. In his view, the statement that an organization is effective necessarily implies a comparison with some other organization or set of organizations. Examples of relative performance measurement in accounting research can be seen in the recent studies of Chenhall and Langfield-Smith (1998) and Abernethy and Brownell (1999).

The behavioral approach. Some behaviorally oriented performance criteria may be better than others. At least criteria such as motivation, effort level and job satisfaction possess high generalizability. Hence, the generalizability of behavioral measures may range from low to high.

## 5. CONCLUSIONS

Overall, the applied classification into accounting-based, goal-centered, and behavioral performance measurement approaches using various research methods seems to be a possible way to classify accounting studies. Several of Steers' dimensions appear useful in rating the advantages and disadvantages as well as potential tendencies and differences between the various approaches. Whilst the suggested ratings do not provide hard and fast principles, they, nevertheless, suggest the following tendencies: Each of the three key approaches to performance measurement possesses high theoretical relevance, and a time perspective ranging from low to high (see Table 5). The other five dimensions suggest certain differences for studies using the various approaches and methods. In general, the strengths of the accounting-based approach to performance measurement seem to include: appropriateness at both the macro and micro levels of analysis, relatively high criterion stability, the possibility of using single or multiple criteria, precise measurement (in particular, in the archival analysis of financial statements), and high generalizability of criteria and results. In the light of these dimensions, accounting studies using archival methods appear superior.

The *goal-centered approach* allows the integration of macro and micro levels of analysis. It relies on multiple criteria. This may be a strength in possibly covering a larger proportion of overall performance. It may also be a weakness if the multiple goals are conflicting, and hence effective performance is not within reach. Therefore, a factor and correlation analysis could be conducted to analyze the structure of multivariate measures. A potential weakness is that precise and objective measurement of actual goals is often difficult, if not impossible. The objectivity and

precision of measurement may be increased with archival and experimental data, and potentially decreased with self-rated survey data. The stability of criteria ranges from low to high, indicating differences between various criteria and situations. The generalizability of criteria ranges from low to high, being lower for studies selecting too specific goals, and higher for studies selecting more general goals. The generalizability of findings is lower for experiments, and higher for archival and survey studies. Since actual goals may have been set too low, it can be useful to compare goal attainment relative to peers.

The potential advantages of *the behavioral approach* include: the possibility to conduct individual level analysis, the existence of both single and multiple criteria, and relatively high generalizability of criteria. In addition, experiments allow precise measurement, but are conducted at specific point(s) of time and the generalizability of their findings ranges from low to medium. In contrast, the behavioral approach towards applying surveys can allow generalizations of findings but their precision of measurement may be lower. The criterion stability ranges from low to high indicating differences between various criteria and situations.

Whilst the accounting-based performance studies using archival methods appear superior in the light of several dimensions, no approach dominates the others on all factors, thereby suggesting that multiple approaches are needed in accounting research. Hence, the choice of a performance measurement approach is, at least in part, likely to depend on how the differing dimensions are weighted. At a minimum, the choice of a performance measurement approach is likely to be impacted by the level of analysis and data availability as shown in Table 6. A possible interpretation is that when the level of analysis is organizational, between organizations, or between industries, the possibility of collecting accounting performance measures from archives and databases is relatively high (see also Table 2, Panel B). However, issues with differing profit potentials may require supplementing the more objective measures with self-rated or researcher-collected relative (to peers) measures. Difficulties in obtaining financial performance information at the proper level of analysis may require trading off more objective measurements and increasing subjectivity with self-or researcher-rated financial measures. This is often the case with privately held firms, conglomerate business units, departments, groups, and individuals. In contrast, when the level of analysis is an individual, financial information is not available except in some rare exceptions. A more subjective and behavioral approach is needed to understand the process and/or outcomes of performance. For example, how individuals perceive, understand the meaning of, and experience accounting systems and processes, whilst providing and using accounting information.

There seem to be several ways to develop and extend performance measurements. First, not only could different forms of research build on each other, as has been the case in empirical auditor judgment performance research, but the accounting research could also be made strong-

er by combining various research methods. Experimental data could be combined with archival or survey data to improve the generalizability of findings. Self- or researcher-rated performance measures could increasingly be correlated with measures derived from archival sources or from laboratory experiments to enhance the objectivity and precision of performance measurement. Note that a few of the reviewed 100 studies had selected a multiple method approach. These are the management accounting studies of Anderson et al. (2002), Banker et al. (2000), Emsley (2000), Davila (2000), Chapman (1998), Abernethy et al. (1997), and Selto et al. (1995).

Second, the precision of self-reported outcome measures could be improved in various ways. Interview and mail surveys could best be used when the respondents do not have an incentive to give a biased answer, but nonetheless possess important inside information. Assured confidentiality of responses could also enhance this goal. Multiple respondents could be used to cross-check the responses.

Third, in addition to measuring perceived absolute performance, performance could also increasingly be assessed in relative (to peers) terms. The performance measures of Dess and Robinson (1984), Chapman (1998), Chenhall and Langfield-Smith (1998), and Abernethy and Brownell (1999) provide some examples.

Fourth, whether the analysis of a single point of time, mean performance over a longer period of time, or longitudinal design is the most appropriate requires careful consideration. Longitudinal design has several important advantages that are worth keeping in mind.

Fifth, various performance measurement approaches and performance measures could be used simultaneously. This could aid managers and scholars in understanding the financial, organizational and behavioral consequences of various accounting systems and decisions.

Sixth, whilst some diversity of measures is needed to advance our knowledge of the various aspects of accounting systems and processes, it is more difficult to compare the findings of different studies due to diversity of performance measures. Hence, accounting research could ideally be moved toward a more cumulative direction. Replication that builds understanding is needed. Statistical reliability and validity of utilized survey measures should be compared and contrasted. Comprehensive analyses are also needed of the extent to which various performance measurement approaches and performance measures correlate with each other in a positive way. That kind of analysis could aid researchers and practitioners in assessing the level of variance in their results.

Seventh, further empirical research could be directed towards studying the performance of accountants, analysts, not-for-profit organizations, service organizations, and multinational companies. Eight, future research could be directed at developing the goal-centered approach to performance measurement. Finally, the potential determinants of performance could be integrated and further tested. ■



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APPENDIX 1. Panel A. Summary of studies drawn from the Accounting Review.

1. Study	2. Approach to performance	3. Method	4. Sample	5. Performance criteria	6. Source of performance measure	7. Other variables <sup>1</sup>	8. Main findings <sup>2</sup>
Fisher, Maines, Pfeffer & Sprinkle (2002)	Behavioral	Laboratory experiment	174 under- graduate students	Subordinate performance	-	Resource allocation, Information asymmetry Budget proposal, Slack in final budget JIT adoption	Support
Kinney & Wempe (2002)	Accounting- based	Database	402 firms	Profit margin Asset turnover	-		Partial support
Hyatt & Prawitt (2001)	Behavioral	Survey	375 staff and senior auditors	Auditors' job performance	-	Locus of control, Audit structure	Support
Sprinkle (2000)	Behavioral	Experiment	40 under- graduate students	Individual performance, Effort level	Bettman et al. (1990)	Compensation contracts, Individual learning	Support
Lipe & Salterio (2000)	Behavioral	Experiment	58 M.B.A. students	Judgmental performance	-	Common measures, Unique measures	Partial support
Hopkins, Houston & Peters (2000)	Behavioral	Experiment	113 analysts & portfolio- managers	Analysts' stock- price judgments	-	Method of accounting, Business combinations	Partial support
Maines & McDaniel (2000)	Behavioral	Experiment	95 M.B.A. students	Investors' judgments	-	Presentation format, Comprehensive income	Partial support

<sup>1</sup> E.g., independent, moderating and mediating variables.

<sup>2</sup> This column provides information of the hypothesized relationships between performance criteria (column 5) and other variables (Column 7) documented in each study.



Fisher, Frederickson & Pfeffer (2000)	Behavioral	Laboratory experiment	185 under-graduate students	Subordinate performance	-	Negotiation, Participative budgeting, Budgetary slack	Partial support
Banker, Potter & Srinivasan (2000)	Accounting-based	Archival & survey	18 hotels	Operating profit Contribution from toll-free lines	Company	Non-financial performance measures, Likelihood of return, Customer complaints	Support
Libby & Kinney (2000)	Behavioral	Experiment	70 audit managers	Auditor judgment performance	-	Analysts' forecasts, Auditing standards	Partial support
Shelton (1999)	Behavioral	Experiment	87 partners, managers and audit seniors	Audit performance	-	Irrelevant information	Support
Mikhail, Walther & Willis (1999)	Behavioral	Data base	1607 analysts	Forecast accuracy	-	Analyst turnover	Partial support
Sprinkle & Tubbs (1998)	Behavioral	Experiment	28 auditors	Auditing effectiveness	-	Audit risk, Information importance	Partial support
Cloyd (1997)	Behavioral	Experiment	63 Tax professionals	Tax research performance	-	Prior knowledge, Accountability	Partial support
Asare & McDaniel (1996)	Behavioral	Laboratory experiment	162 auditors	Audit performance	-	Familiarity with the reviewer, Task complexity	Partial support
Balakrishnan, Linsmeier & Venkatachalam (1996)	Accounting-based	Laboratory experiment	92 firms	Return on assets	Financial statements	Just-in-Time inventory method, Customer concentration	Partial support
Bonner, Libby & Nelson (1996)	Behavioral	Laboratory experiment	105 auditors	Audit performance	Nelson et al.(1995)	Decision aids	Support

Todd & Ramanathan (1994)	Goal-oriented	Archival	New York City Police Department	Socially desired non-financial goals	-	Budgetary allocations, Budgetary slack, Task complexity	Support
Bonner & Walker (1994)	Behavioral	Laboratory experiment	95 under-graduate students	Audit performance	-	Instruction, Experience, Ability, Knowledge	Support
Young, Fisher & Lindquist (1993)	Goal-centered	Laboratory experiment	96 under-graduate students	The number of good units produced within a period	-	Intra-group co-operation, Inter-group competitive, feedback, Time	Partial support
Nelson (1993)	Behavioral	Laboratory experiment	74 auditors, 199 students	Audit performance	-	Knowledge, Learning frequency	Support
Enis (1993)	Accounting-based	Mail survey	307 motor carriers	The operating ratio Net income	Industry analysis	Earnings based compensation plans	Partial support
Kren (1992)	Behavioral	Mail survey	80 PC managers from 63 firms	Managerial performance	Mahoney et al. (1965)	Budgetary participation, Information, Environment	Partial support
Frederickson (1992)	Behavioral	Laboratory experiment	36 MBA students	Individual's effort level	-	Uncertainty, Compensation	Partial support
Tubbs (1992)	Behavioral	Laboratory experiment	75 auditors 23 students	Audit performance	-	Experience, Knowledge	Partial support
Frucot & Shearon (1991)	Behavioral	Mail survey	83 managers from 21 firms	Managerial performance Job satisfaction	Mahoney et al. (1963) Weiss et al. (1967)	Budgetary participation, Locus of control, Percentage of foreign ownership	Support
Bedard & Biggs (1991)	Behavioral	Laboratory experiment	21 auditors	Audit performance	-	Pattern recognition, Hypotheses development	Support

Bonner (1990)	Behavioral	Laboratory experiment	63 auditors	Audit performance	-	The role of task specific knowledge	Partial support
Whuler & Panu (1990)	Behavioral	Archival	5 sample firms	Individual's test performance	Kinney (1987) Coakley & Loebbecke (1985)	Analytical procedure	Partial support
Awasthi & Pratt (1990)	Behavioral	Laboratory experiment	70 under-graduate students	Effort level Decision performance	-	Monetary incentive, Cognitive characteristics	Mixed results
Simnett & Trotman (1989)	Behavioral	Laboratory experiment	84 senior auditors	Audit performance	-	Information choice, Information processing	Support
Knechel (1988)	Behavioral	Simulation observations	4800	Audit performance	-	Investigation rules	Partial support
Chow & Cooper (1988)	Behavioral	Laboratory experiment	40 college students	Subject's test performance	-	Pay scheme, Information asymmetry	Support
Wright (1988)	Behavioral	Mail survey	110 accountants	Job performance	Dunette et al. (1979)	Accounting degree	Partial support
Skew & Faley (1988)	Behavioral	Archival	352 students	Subject's examination performance	-	Scholastic aptitude, Academic performance, Effort/motivation, Prior exposure to subject area	Partial support
Collins, Munter & Finn (1987)	Behavioral	Mail survey	1339 planning executives or managers	Budget attitude	Collins (1978)	Leadership style, Budget games	Support
Ingram & Petersen (1987)	Behavioral	Laboratory experiment	122 students	Accounting grades	AICPA tests	Scores on AICPA aptitude tests & prior accounting grades	Partial support

Vruwink & Otto (1987)	Behavioral	Laboratory experiment	161 students	Examination score	-	Teaching techniques	No support
Knechel & Snowball (1987)	Behavioral	Laboratory experiment	216 students	Academic performance	-	Student internships	Partial support

Panel B. Summary of studies drawn from Accounting, Organizations and Society.

1. Study	2. Approach to performance	3. Method	4. Sample	5. Performance criteria	6. Source of performance measure	7. Other variables	8. Main findings
Fisher, Frederickson & Pfeffer (2002)	Behavioral	Experiment	104 under-graduate students	Subordinate performance	Fisher et al. (2000)	Information asymmetry, Budget negotiation, Budgetary slack	Partial support
Anderson, Hesford & Young (2002)	Behavioral	Mail & interview surveys	2 firms	ABC model development time and complexity	-	Group dynamics, Level of resources	Partial support
Viator (2002)	Behavioral	Mail survey	794 CPAs	Job performance, Turnover intentions	Kalbers et al. (1995) Gregson et al. (1994)	Formal & informal mentoring, Role stress, Role conflict, Role ambiguity, Perceived environmental uncertainty	Partial support
Van der Stede (2000)	Accounting-based Behavioral	Archival & Survey	190 business unit managers	Business unit performance	-	Budgetary control style, Budgetary slack, Manag. time-orientation, Competitive strategy	Partial support
Vagneur & Peiperl (2000)	Goal-centered Accounting-based	Survey & archival	Managers of 20 British-based int. companies	Company performance	Steers (1975)	Evaluative style	Partial support

Otley & Pollanen (2000)	Behavioral	Mail survey	176 senior administrators	Managerial performance	Mahoney et al. (1963) Kahn et al. (1964)	Budget emphasis, Participation, Task uncertainty, Job satisfaction	Partial support
Davila (2000)	Goal-centered	Case-study, survey	Managers from 12 bus. units & of 11 firms	Project performance	Shenhari & Dvir (1996)	Project uncertainty, Product strategy, Management control systems	Partial support
Shields, Deng, Kato (2000)	Goal-centered	Mail survey	358 design engineers	Job performance	-	Participative standard setting, Standard-based incentives, Standard tightness, Job-related stress, Information use in problem solving	Partial support
Emsley (2000)	Goal-centered	Archival & survey	A chemical manufacturer, 38 managers from other firms	Department performance	Company	Number of problem solving approaches	Support
Rankin & Sayre (2000)	Behavioral	Experiment	Students	Effort level	-	Performance separability, Contract type	Partial support
Gosh (2000)	Behavioral	Experiment	104 under-graduate	Firm profit Firm profit efficiency	-	Sourcing, Compensation structure, Fairness Conflict, Negotiators' time	Support
Libby (1999)	Behavioral	Experiment	174 students	Experimental task performance	A variation of Chow (1983)	Involvement in budgeting, Communication of a rational	Support
Scott & Tiessen (1999)	Behavioral	Mail survey	248 organizat. members	Team performance	-	Incidence and importance of performance measurement	Support

Hirst & Yetton (1999)	Behavioral	Experiment	64 managers	Task performance	-	Goal setting, Task interdependence	Partial support
Abernethy & Brownell (1999)	Goal-centered	Mail survey	64 public hospitals	Hospital performance	-	Strategic change, Style of budget use	Support
Chapman (1998)	Behavioral	Case study Mail survey	4 companies	Relative performance of the organization	Author	Relative level of uncertainty, Coordination	Support
Nouri & Parker (1998)	Goal-centered	Survey	135 managers of a large U.S. corporation	Job performance	A version of Govindarajan (1984)	Budget participation, Budget Adequacy, Organizational support	Support
Chenhall & Langenfeld-Smith (1998)	Goal-centered	Mail survey	78 large Australian manufacturing firms	Relative firm performance	A version of Govindarajan (1984)	Strategic priorities, Management techniques, Management accounting practices	Partial support
Dezort (1998)	Behavioral	Laboratory experiment	87 audit committee members	An internal control oversight task	A version of Ashton (1974)	Experience	Support
Harrison & Poole (1997)	Accounting-based	Mail survey	109 managers of manufacturing firms/divisions	Self-rated relative sales growth, profitability and ROA	Chenhall (1993)	Customer-focused strategy, Nonfinancial performance measures	No support
Itner & Larcker (1997)	Accounting-based	Survey	249 automotive & computer firms in Canada, Germany, Japan and the U.S.A.	Self-rated pre-tax ROA, pre-tax return on firm-s sales, sales growth & organizational performance	Management consultant firm	Quality strategy, Strategic control systems, Control variables	Partial support

Abernethy & Brownell (1997)	Behavioral	Mail and interview surveys	150 senior research officers of two firms	Managerial performance	Mahoney et al. (1963, 1965)	Task characteristics, Accounting and non-accounting controls	Partial support
Chao (1996)	Behavioral	Laboratory experiment	58 auditors	Audit performance		Knowledge content	Support
Chong (1996)	Behavioral	Mail survey	42 managers	Managerial performance	Mahoney et al. (1963, 1965)	MAS design, Task uncertainty	Support
Ismail & Trotman (1995)	Behavioral	Laboratory experiment	38 audit teams	Audit performance	-	Discussion effect, Rank effect	Partial support
Lau, Low & Eggleton (1995)	Behavioral	Mail survey	112 functional heads	Managerial performance	Mahoney et al. (1963, 1965)	Budget emphasis, Budgetary participation, Task characteristics	Support
Magner, Welker & Campbell (1995)	Behavioral	Mail survey	53 managers	Managers' attitudes toward supervisor, organizational commitment	Read (1962), Mowday et al. (1979)	Budgetary participation, Budget favorability	Support
Selto, Renner & Young (1995)	Goal-centered, Behavioral	Mail survey, archival	406 direct labor operators, 19 managers	Attainment of work group goals, job satisfaction	Firm data, Drazin et al. (1985)	Task, Job dependency on supervisor/work group, Organizational structure, MCS process, Manufacturing context	Partial support
Mia & Chenhall (1994)	Behavioral	Survey	75 managers	Managerial performance	-	Broad scope information, Differentiation of activities	Partial support
Gul & Chia (1994)	Behavioral	Mail survey	48 managers	Managerial performance	Mahoney et al. (1963)	Environmental uncertainty, Decentralization, MAS design	Support

Dunk (1993)	Behavioral	Mail survey	79 managers	Managerial performance	Mahoney et al. (1963, 1965)	Job-related tension, Participation	Support
Herremans, Akathaporn & McInnes (1993)	Accounting-based	Archival	76-96 firms	Operating margin Net margin ROA, ROE	-	Social responsibility reputation	Support
Harrison (1992)	Behavioral	Mail survey	211 middle-level managers	Job related tension, Job satisfaction	Kahn et al. (1964) Weiss et al. (1967)	Participation, Budget emphasis	Support
Dunk (1992)	Behavioral	Mail survey	24 production managers	Production subunit overall performance	Merchant (1981)	Automation, Reliance on budgetary control	Support
Gordon & Smith (1992)	Accounting-based	Mail survey	42 firms	Long-term excess return to shareholders	-	Postauditing of capital investments	Support
Chow, Cooper & Haddad (1991)	Behavioral	Laboratory experiment	55 business students	Subordinates' experiment performance	Chow et al. (1988)	Pay schemes, Ratchets	Support
Abemethy & Stoelwinder (1991)	Goal-centered	Mail survey	192 subunit managers	Subunit performance	Govindarajan (1984)	Task uncertainty, Budget use, System goal-orientation	Support
McInnes & Ramakrishnan (1990)	Behavioral	Mail survey	415 managers	Budget/overall motivation, Managerial performance, Effort level	Authors, Mahoney et al. (1963), Authors	Rewards elements	Support
Chow, Shields & Chan (1991)	Goal-centered	Laboratory experiment	192 students	Manufacturing experiment performance	Chow (1983)	Management controls, National culture	Support
Dunk (1990)	Behavioral	Mail survey	26 managers	Managerial performance	Mahoney et al. (1963, 1965)	Budgetary participation, Evaluation agreement	Support



Williams, Macintosh & Moore (1990)	Goal-centered	Mail survey	201 managers	Relative departmental performance	Van de Ven et al. (1980)	Budgetary behavior	Support
Hirst & Lowy (1990)	Behavioral	Mail survey	44 senior managers	Budgetary performance Overall job performance	Kenis (1979)	Budgetary goal difficulty, Feedback	Support
Dunk (1989)	Behavioral	Mail survey	26 production managers	Managerial performance	Mahoney et al. (1963, 1965)	Budget emphasis, Budgetary participation	Partial support
Imoisili (1989)	Behavioral	Mail survey	102 cost-center managers	Managerial performance Attitude towards budgeting staff	Van de Ven et al. (1980)	Task interdependency, Task uncertainty, Job stress, Budget evaluation style	No support
Mia (1989)	Behavioral	Mail survey	76 middle-level managers	Managerial performance Work motivation	Lawler et al. (1970)	Participation, Job difficulty	Partial support
Chenhall & Brownell (1988)	Behavioral	Mail survey	33 managers	Job satisfaction Managerial performance	Weiss et al. (1969)	Participative budgeting, Role ambiguity	Support
Mia (1988)	Behavioral	Mail survey	83 lower and middle-level & 51 senior managers	Attitudes towards job and company, Work motivation, Managerial performance	Milani (1975) Lawler et al. (1973)	Budget participation	Support
Young, Shields & Wolf (1988)	Behavioral	Laboratory experiment	120 students	Experiment performance	Young (1985)	Manufacturing controls	Support
Haka (1987)	Accounting-based	Mail survey	35 students	Risk (beta), Total assets	-	Decentralization, Information systems, Reward system, Strategy, Environmental predictability/diversity	Partial support

Panel C. Summary of studies selected from the Journal of Accounting Research.

1. Study	2. Approach to performance	3. Method	4. Sample	5. Performance criteria	6. Source of performance measure	7. Other variables	8. Main findings
Ittner, Lanen & Larcker (2002)	Goal-oriented	Survey	2789 Industry Week subscribers	Manufacturing plant performance (ROA, quality, time)	-	Activity-based costing	Partial support
Tong Tan & Kao (1999)	Behavioral	Experiment	105 auditors	Auditor performance	Bonner & Lewis (1990)	Knowledge, Problem-solving ability, Task complexity	Support
Ittner & Larcker (1998)	Accounting-based	Archival	A telecommunication firm	Accounting performance	Firm measure	Customer satisfaction measures	Support
Mikhail, Walther & Willis (1997)	Accounting-based	Archival	236 analysts	Analyst forecasting performance	-	Firm-specific experience	Support
Davidson & Gist (1996)	Accounting-based	Mail survey	75 auditors	Total audit hours/total assets	Palmrose (1989)	Audit planning	Support
McDaniel & Kinney (1995)	Behavioral	Laboratory experiment	118 auditors	Audit performance	-	Analytical procedures guidance	Support
Ittner & Larcker (1995)	Goal-centered	Mail survey	249 firms	Self-reported pretax ROA Product quality	-	Advanced manufacturing practices, Information and reward systems	Mixed support

Ely (1991)	Accounting-based	Archival	173 firms	Accounting returns, Sales revenue, Net interest income, Stock returns	-	CEO compensation	Support
McDaniel (1990)	Behavioral	Laboratory experiment	179 staff auditors	Audit performance	-	Time pressure, Auditing program, structure	Support
Brownell & Merchant (1990)	Behavioral	Mail survey	146 production managers	Relative departmental performance	-	Product standardization, Manufacturing process automation	Partial support
Ashton (1990)	Behavioral	Laboratory experiment	182 auditors	Decision-making performance	-	Incentives, Feedback, Justification, Decision aids	Support
Lambert & Larcker (1987)	Accounting-based	Archival	370 firms	ROE, security market return	-	Compensation	Partial support